

Design/Engineering/Materials

Design & Engineering

PR=Prerequisite Requirement

Introduction to Engineering

Design (IED)

IND600

Grade: 9-12

PR: Algebra

Principles of Engineering (POE)

IND610

Grade: 10 -12

PR: Algebra

Civil Engineering and Architecture Design (CEA)

IND630

Grade: 10-12

PR: Algebra

Digital Electronics

IND620

Grade: 10-12

PR: Algebra

Aerospace Engineering

IND670

Grade: 10-12

PR: Introduction into Engineering
Design

Computer Science A

IND660

Grade: 10-12

CR: Algebra

Computer Science

Principles

IND650

Grade: 10-12

PR: Algebra

Career Immersion

MOC

BUS450

Grade: 12

PR: Application and Interview

Design/Engineering/Materials Construction/Carpentry

PR=Prerequisite Requirement

Woods: Materials & Processes

IND240
Grade: 9-10
PR: None

Cabinet Making (Woods II)

IND250
Grade: 10-12
PR: Woods: M&P

Residential Construction I

IND120
Grade: 9-12
PR: None

Residential Construction II

IND125
Grade: 11-12
PR: Residential Construction I

Capstone Building Trades

IND500
Grade: 12
PR: Application and Interview

Career Immersion MOC

BUS450
Grade: 12
PR: Application and Interview

Design/Engineering/Materials Manufacturing

PR=Prerequisite Requirement

Mechanical Drawing

IND110
Grade: 9-12
PR: None

Computer Integrated Manufacturing

IND640
Grade: 9-12
PR: Algebra

Production Graphics/Graphic Communications

IND140
Grade: 9-12
PR: None

Metals: Materials and Processes

IND310
Grade: 11-12
PR: None

Career Immersion

MOC
BUS450
Grade: 12
PR: Application and Interview

Mechanical Drawing

Course #: IND110
Grade Level: 9-12
Credits: 5
Length: 1 Quarter
Format: Block
Prerequisite: none

Considerations: None

Course Description: This course is designed to provide practical application of drafting knowledge practices through sketching and computer aided drafting (CAD). Students learn to use different types of drawing to describe and communicate ideas.

Residential Construction I

Course #: IND120
Grade Level: 9-12
Credits: 5
Length: 1 Quarter
Format: Block
Prerequisite: none

Considerations: none

Course Description: This is an introductory course for students who wish to explore the construction industry and related careers. Major activities covered through construction of a wall section include: concrete framing, roofing, plumbing and electrical.

Residential Construction II

Course #: IND125
Grade Level: 11-12 or approval
Credits: 5
Length: 1 Quarter
Format: Block
Prerequisite: Residential Const I

Considerations: None

Course Description: This is an advance course that provides students an opportunity to learn about materials, processes and careers found in Residential Construction. Activities include building and expanding on basics covered in Residential Construction I.



Production Graphics/Graphic Communications

Course #: IND140
Grade Level: 9-12
Credits: 5
Length: 1 Quarter
Format: Block
Prerequisite: none

Considerations: none

Course Description: This course is designed to teach students introductory skills used in graphic productions. Emphasis will be placed on the developments of skills related to the design of layouts, digital photography, screen printing and use of Adobe Photoshop & InDesign.



Computer Integrated Manufacturing (CIM)

Course #: IND640 
Grade Level: 9-12
Credits: 10 
Length: 2 Quarters
Format: Block
Co-requisite: Algebra

Considerations: This course articulates credit with Kirkwood Community College.

Course Description: How are things made? What processes go into creating products? Is the process for making a water bottle the same as it is for a musical instrument? How do assembly lines work? How has automation changed the face of manufacturing? While students discover the answers to these questions, they are learning about the history of manufacturing, robotics and automation, manufacturing processes, computer modeling, manufacturing equipment, and flexible manufacturing systems.

Civil Engineering and Architectural Design (CEA)

Course #: IND630 
Grade Level: 10-12
Credits: 10 
Length: 2 Quarters
Format: Block
Prerequisite: Algebra

Considerations: This course articulates credit with Kirkwood Community College.

Course Description: Students learn about various aspects of civil engineering and architecture and apply their knowledge to the design and development of residential and commercial properties and structures. Students will use 3D design software to design and document solutions for major course projects. Students communicate and present solutions to their peers and members of a professional community of engineers and architects.

Woods: Materials and Processes

(Formally Introduction to Finish Carpentry)
Course #: IND240
Grade Level: 10-12
Credits: 10
Length: 2 Quarters
Format: Block
Prerequisite: none

Considerations: Grade of 80% or higher for second quarter of Woods: Materials and Processes is required.

Course Description: This course is designed to teach skills necessary for basic woodworking applications. The course stresses student safety through a series of demonstrations and safety tests. Students will plan and construct introductory projects to gain skills necessary to complete a final project of their choosing. A lathe project is also required.

Cabinet Making

Course #: IND250
Grade Level: 10-12
Credits: 10
Length: 2 Quarters
Format: Block
Prerequisite: Woods: Materials and Processes

Considerations: Grade of 80% or higher for second quarter of Woods: Materials and Processes is required.

Fees: Students will be allotted materials for required projects. Additional fees may be charged if a student exceeds the allotted amount

Course Description: This course is designed to expand basic skills learned in Woods: Materials and Processes. A review of machine safety will precede project work. Students will design and draw plans for their project, calculate costs and devise a plan of procedure for completion of their project prior to starting work. Project work will be required to include at least one dovetailed drawer, rail, stile and panel piece.

Metals: Materials and Processes

(Formally Metal Fabrications)

Course #: IND310
Grade Level: 11-12
Credits: 10
Length: 2 Quarters
Format: Block
Prerequisite: none

Considerations: Fees the same as Cabinet Making

Course Description: This course will provide students the opportunity to explore the field of metal and develop skills in working with metal fabrication. The areas covered are welding, sheet metal, machining, and foundry.

Building Trades Capstone Course

Course #: IND500
Grade Level: 12
Credits: 20
Length: 2 Semesters
Format: Block
Prerequisite: none
Fees: purchase of safety equipment such as glasses or ear protection

Considerations: Limit of seven Linn-Mar students. Students are selected by recommendation of Linn-Mar staff. Student must provide transportation to off-campus site.

Course Description: Linn-Mar and Marion High School students work two hours a day to build a full-sized house. The course includes all skills and tasks needed to complete this activity.

Intro to Engineering Design



Course #: IND600
Grade Level: 9-12
Credits: 10
Length: 2 Quarters
Format: Block
Co-requisite: Have taken or currently taking Algebra

Considerations: See prerequisites. Project Lead the Way (PLTW) engineering courses do not replace other science classes. Students taking PLTW courses should also take 3 or more semesters of traditional science courses. Students will earn credit for this course from Kirkwood Community College upon successful completion.

Course Description: Students in this hands-on, project-based course will focus on creative design processes, communication and teamwork skills. 3D CAD software will be used to produce, analyze, and evaluate product modes. Sketching, geometric relationships, 3D modeling, production and marketing will be studied through the development of designs.

Digital Electronics (DE)



Course #: IND620
 Grade Level: 10-12
 Credits: 10
 Length: 2 Quarters
 Format: Block
 Prerequisite: none

Considerations: see prerequisites. This is the third course recommended in the **Project Lead the Way** engineering sequence. Students may be able to earn community college credit with successful completion of this course.

Course Description: This course is the foundation of all modern electronic devices such as mobile phones, MP3 players, laptop computers, digital cameras and high-definition televisions. Students are introduced to the process of combinational and sequential logic design, engineering standards and technical documentation.

Principles of Engineering



Course #: IND610
 Grade Level: 10-12
 Credits: 10
 Length: 2 Quarters
 Format: Block
 Prerequisite: Algebra

Considerations: See prerequisites. Students will earn credit for this course from Kirkwood Community College upon successful completion.

Course Description: Students will apply science and math to solve practical problems. Topics covered include machines, kinematics, thermodynamics, control systems and materials. This course will give students an idea of what some college engineering coursework is like.

Computer Science Principles (CSP)



Course#: IND650
 Grade Level: 9-12
 Credits: 10
 Length: 2 Quarters
 Format: Block
 Corequisite: Pre-Algebra

Considerations: Students should be interested in learning new computer skills, but prior programming experience is NOT required. This is a Project Lead the Way (PLTW) course; PLTW courses tend to be hands on, project based, challenging courses. This course prepares students for the AP Computer Science Principles test.

Course Description: Explore a variety of fields within computer science: Python programming, app development, visualization of data, cybersecurity, simulation, and creating webpages. This course aims to develop computational thinking, generate interest in career paths that utilize computing, and introduce professional tools that foster creativity and collaboration. CSP helps students develop programming experience and explore the workings of the Internet.

Computer Science A (CSA)



Course #: IND660
Grade Level: 10-12
Credits: 10
Length: 2 Quarters
Format: Block
Corequisite: Algebra

Considerations: Students with no prior programming experience should consider taking CSE (Computer Science and Software Engineering) before taking CSA. Academically motivated students can take CSA without previously taking CSE. This course prepares students for the AP Computer Science A exam.

Course Description: CSA focuses on integrating technologies across multiple platforms and networks, including the Internet. Students collaborate to produce programs that integrate mobile devices and leverage those devices for distributed collection and data processing. Students analyze, adapt, and improve each other's programs while working primarily in Java and other industry-standard tools. This course prepares students for the AP Computer A course.

Aerospace Engineering (AE)



Course #: IND670
Grade Level: 10-12
Credits: 10
Length: 2 Quarters
Format: Block
Prerequisite: Introduction to Engineering Design

Considerations: None

Course Description: The major focus of the Aerospace Engineering course is to expose students to the world of aeronautics, flight, and engineering. Students will employ engineering and scientific concepts in the solution of aerospace problems. Lessons will engage students in engineering design problems related to aerospace information systems, astronautics, rocketry, propulsion, the physics of space science, space life sciences, the biology of space science, principles of aeronautics, structures and materials, and systems engineering